

ASSESSING THE STATUS AND DISTRIBUTION OF THE GREAT SLATY WOODPECKER *MULLERIPICUS PULVERULENTUS* (TEMMINCK 1826) IN SUB-HIMALAYAN UTTARAKHAND, INDIA

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Owing to its global decline, the Great Slaty Woodpecker *Mulleripicus pulverulentus* has been categorised as Vulnerable by IUCN. In India, the species is rare and occurs in the sub-Himalayan moist tropical forests from Uttarakhand in the west to Arunachal Pradesh in the east. Available records indicate that the Great Slaty Woodpecker (GSW) is dependent upon mature dipterocarp forests. However, there is very little scientific information on its distribution or habitat preferences in India. We surveyed the distribution of GSW and searched for its breeding sites in the Sal forests of western Uttarakhand. Using forest department records, we identified 50 sites having relatively mature Sal forests, which were likely to harbour GSW. At each site we carried out call playback surveys to detect the presence of GSW and qualitatively evaluated forest habitat structure. We detected GSW presence at seven sites, observed breeding at three, and found nesting trees at six sites. GSW was observed mainly in mature Sal-dominated forests in sloping terrain. Most trees in which cavities were found were deformed or diseased and had a median diameter at breast height (DBH) of 53.5 cm. For conserving GSW, it is important that mature Sal stands be retained, and silvicultural removal of deformed trees be discontinued.

Key words: Woodpeckers, Western Himalaya, *Shorea robusta*, cavity-nesters, breeding

INTRODUCTION

Woodpeckers (Family Picidae) are highly sensitive to changes in woody vegetation attributable to anthropogenic causes, including those related to forest management and exploitation (Short and Horne 1990; Winkler *et al.* 1995). Operations like logging, systematic manipulation for forest structure, plantations, and fuel wood extraction are therefore likely to have an impact on the extant woodpecker community (Mikusiński 2006).

Large woodpeckers are affected by conventional forestry operations to a much greater degree than smaller ones as large-bodied woodpeckers generally require larger trees for nesting, roosting and foraging, and such trees are usually the first to be harvested in typical silvicultural practices (Short and Horne 1990). They also require larger areas of forest for foraging. Decline of old-growth forests is believed to be the main causative factor for the extinction of two of the world's largest woodpecker species, Imperial Woodpecker *Campephilus imperialis* and Ivory-billed Woodpecker *C. principalis* in the Americas (Short and Horne 1990).

The Great Slaty Woodpecker *Mulleripicus pulverulentus* (Temminck 1826), is the largest in Asia, and perhaps the largest surviving picid in the world. Although this species is distributed widely, extending from Greater Sundas, through Indo-China, Myanmar, SE Bangladesh, Nepal, north-east India and the terai and foothills of India from Arunachal Pradesh to Himachal Pradesh, it is scarce throughout its geographic range (Winkler *et al.* 1995). The

Great Slaty Woodpecker inhabits mature dipterocarp forests wherever it exists in the world (Winkler *et al.* 1995). The species breeds cooperatively (Lammertink 2004), and we have observed it in groups of up to 12 individuals.

Like the Imperial and the Ivory-billed, the Great Slaty Woodpecker too has experienced a decline due to logging of primary dipterocarp forests. According to a recent study, the global population of this species has been reduced by as much as 90% during the last 100 years, primarily due to habitat loss to logging (Lammertink *et al.* 2009). Taking note of this finding, the IUCN elevated the threatened status of Great Slaty Woodpecker to Vulnerable in 2010 (BirdLife International 2010).

In India, the Great Slaty Woodpecker is believed to occur in a narrow, discontinuous belt of sub-Himalayan moist deciduous forests (Ali and Ripley 1983), mostly consisting of Sal (*Shorea robusta*), extending from Uttarakhand in the west to Arunachal Pradesh in the east, up to 1000 msl. The species is rare throughout its range. However, it may be seen fairly often at places where it occurs, e.g. in Dudhwa National Park in Uttar Pradesh (D. Mohan, pers. comm.), Corbett Tiger Reserve, Ramnagar and Lansdowne forest divisions in Uttarakhand (authors pers. obs.; Mohan and Kumar 2010). Occasional sightings of the species have been reported from Arunachal Pradesh (R. Naniwadekar and S. Prasad, pers. comm.; P. Singh, pers. comm.). However, no systematic distributional surveys have been undertaken in India.

Sub-Himalayan Uttarakhand forms a significant part of the distribution of GSW because this region forms the northernmost as well as westernmost extent of its distribution.

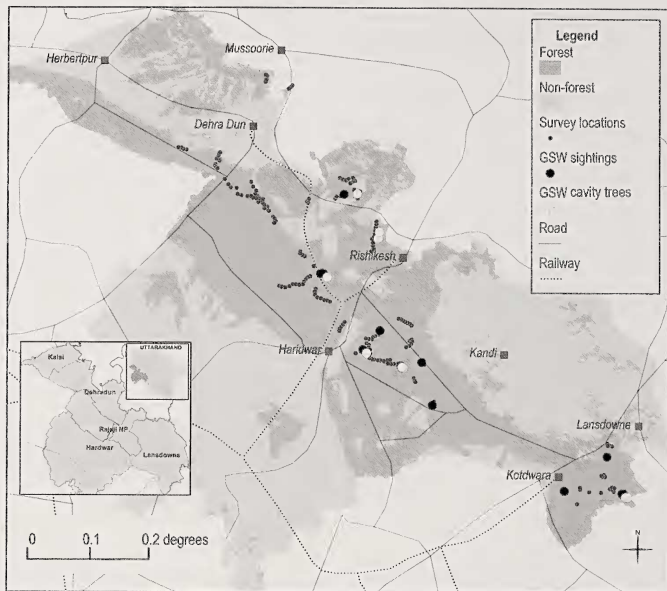


Fig. 1: Location of survey blocks, Great Slaty Woodpecker sightings and cavity trees in the study area. Inset showing major units of forest administration (Forest Divisions) and their location in Uttarakhand

This region is covered by moist deciduous forests dominated by Sal (Champion and Seth 1968). Because of the economic importance of Sal as a source of timber, these forests have been intensively managed for nearly a century. Consequently, the original structure and composition of Sal forests have both been significantly altered. This area is an important repository for biodiversity, as it harbours many species of conservation importance, including Tiger and Asian Elephant, and forms a part of the Terai Arc Landscape (Johnsingh *et al.* 2004). The region is also a vital area for bird diversity that includes 17 species of woodpecker.

Earlier work in the eastern part of sub-Himalayan Uttarakhand (Ramnagar Forest Division and Corbett Tiger Reserve) indicates that the Great Slaty Woodpecker is extremely rare in the region, seen only occasionally in native or managed Sal forest with mature trees (Kumar *et al.* 2011).

Kolhu Chaur in Lansdowne forest division was believed to be the westernmost breeding distribution for the species (Ali and Ripley 1883). Although a few stray (unpublished) sightings of the Great Slaty Woodpecker have been reported from the area west of Kolhu Chaur, i.e. Rajaji National Park (A. Harihar, pers. comm.) and Dehradun Forest Division (authors pers. obs.), most of these observations were made during winter when the species is believed to range wider than during the nesting season.

We conducted a study to survey the distribution of Great Slaty Woodpecker in the Sal forests of western Uttarakhand and to search for breeding sites. Through this study, we expected to fill gaps in information about the status of this rare woodpecker, which would be useful in its monitoring and conservation, and would help understand its occurrence in the rest of the sub-Himalayas.

STATUS AND DISTRIBUTION OF GREAT SLATY WOODPECKER

Table 1: Details of locations surveyed, Great Slaty Woodpecker detections, and habitat characteristics

Forest division	Location	No. of playback stations	No. of GSW detection	No. of individuals	No. of GSW cavity trees	Forest composition	Terrain	Forest age
Dehradun	Asarori 1	4	-	-	-	Sal	Flat	Young
Dehradun	Asarori 2	6	-	-	-	Sal	Steep slope	Young
Dehradun	Barkot 1	6	-	-	2	Sal	Flat	Middle
Dehradun	Barkot 2	5	-	-	-	Sal	Flat	Old
Rajaji NP	Ber Sot	5	-	-	-	Sal	Gentle slope	Old
Rajaji NP	Bulindawala 1	4	-	-	-	Sal	Flat	Old
Rajaji NP	Bulindawala 2	5	-	-	-	Sal	Flat	Middle
Dehradun	Chandrabani 1	5	-	-	-	Sal	Flat	Middle
Dehradun	Chandrabani 2	4	-	-	-	Sal	Flat	Middle
Dehradun	Chandrabani WII	4	-	-	-	Sal	Flat	Middle
Lansdowne	Chaukharn	5	2	5, 4	2	Sal	Gentle slope	Old
Rajaji NP	Chilla	4	-	-	-	Sal-mixed	Flat	Middle
Lansdowne	Dhimki Hill	5	-	-	-	Sal	Steep slope	Middle
Lansdowne	Dhimki-Nauri 1	4	-	-	-	Sal	Steep slope	Young
Lansdowne	Dhimki-Nauri 2	4	1	1	-	Sal	Steep slope	Middle
Dehradun	Gajiwari	4	-	-	-	Sal	Steep slope	Young
Rajaji NP	Ghasiram 1	7	-	-	-	Sal	Steep slope	Middle
Rajaji NP	Ghata 1	3	-	-	-	Sal-mixed	Steep slope	Middle
Rajaji NP	Ghata 2	4	-	-	-	Sal-mixed	Gentle slope	Old
Rajaji NP	Hazara	4	1	3	1	Sal	Gentle slope	Old
Rajaji NP	Jhabrawala	5	-	-	-	Sal	Flat	Middle
Rajaji NP	Jogi Chaur	4	-	-	-	Sal	Flat	Middle
Rajaji NP	Kansrao 1	5	1	3	1	Sal	Flat	Old
Rajaji NP	Kansrao 2	5	-	-	-	Sal-mixed	Gentle slope	Old
Dehradun	Karwapani	4	-	-	-	Sal	Flat	Middle
Rajaji NP	Kauriya	7	-	-	-	Sal	Gentle slope	Old
Rajaji NP	Kharkhari	5	-	-	-	Sal	Flat	Old
Rajaji NP	Koelpura 1	4	-	-	-	Sal	Gentle slope	Young
Rajaji NP	Koelpura 2	4	-	-	-	Sal	Steep slope	Middle
Dehradun	Lachiwala	5	-	-	-	Sal	Flat	Old
Rajaji NP	Mithawali	4	-	-	1	Sal-mixed	Steep slope	Old
Rajaji NP	Mundal	6	-	-	-	Mixed	Steep slope	Middle
Lansdowne	Murakhal	4	-	-	-	Sal	Steep slope	Middle
Lansdowne	North Kotdi 1	2	1	5	-	Sal	Steep slope	Middle
Rajaji NP	Phandowala 1	4	-	-	-	Sal	Flat	Middle
Rajaji NP	Phandowala 2	3	-	-	-	Sal	Flat	Middle
Dehradun	Rajpur	4	-	-	-	Sal	Steep slope	Young
Rajaji NP	Ramgarh	3	-	-	-	Sal	Steep slope	Young
Rajaji NP	Rawasan	4	-	-	-	Mixed	Steep slope	Old
Rajaji NP	Sain Sot 1	3	1	3	3	Sal	Gentle slope	Old
Rajaji NP	Sain Sot 2	3	-	-	-	Sal	Gentle slope	Middle
Rajaji NP	Sarkada	3	-	-	-	Mixed	Gentle slope	Old
Rajaji NP	Soni Sot	5	1	2	-	Sal-mixed	Steep slope	Middle
Lansdowne	South Kotdi 1	2	-	-	-	Sal	Gentle slope	Old
Lansdowne	South Kotdi 2	1	-	-	-	Sal-mixed	Steep slope	Middle
Lansdowne	South Kotdi 3	1	-	-	-	Sal	Steep slope	Middle
Dehradun	Thano 1	4	-	-	-	Sal	Flat	Old
Dehradun	Thano 2	6	-	-	-	Sal	Flat	Middle
Dehradun	Thano Ramnagar 15	-	-	-	-	Sal	Flat	Old
Dehradun	Thano Ramnagar 26	-	-	-	1	Sal	Flat	Old

METHODS

Our previous study on woodpecker communities (Kumar *et al.* 2011) as well as published literature from south-east Asia suggests that the Great Slaty Woodpecker was likely to be partial to forests with mature Sal trees. We consulted records of the Uttarakhand Forest Department (i.e., management plans and compartment histories) to identify forest blocks that had older Sal forests, which we expected to potentially support the Great Slaty Woodpecker. Thus, we identified 50 forest blocks in the forest divisions of Lansdowne, Hardwar, Dehradun, Kalsi, and Rajaji National Park (Fig. 1).

At these locations we carried out call playback-assisted surveys to assess the presence of Great Slaty Woodpecker. Woodpeckers, including GSW, exhibit a good response to conspecific call playback in the form of conspicuous visual or aural cues, hence they get detected (Kumar and Singh 2010).

At each location, we selected multiple points to carry out surveys for woodpeckers. Depending on the configuration and terrain, we selected up to seven points at each location but in most cases, we had four to five points per location. At each point, we broadcast the calls of the GSW four times in succession (once in each cardinal direction), interspersed with a 10-second observation interval. The minimum distance between successive points was 400 m, to avoid overlap between the coverage areas of the consecutive broadcast stations.

In conjunction with playback surveys, we qualitatively assessed the forest age (old, medium and young), composition (Sal-dominated vs. mixed) and slope for each location.

Playback surveys were conducted between May and August 2011. The locations surveyed were distributed over a Sal forest c. 100 km long and 35 km wide, oriented in a NW–SE direction. In all, 213 broadcast stations were used to conduct playback (Table 1, Fig. 1).

RESULTS

We sighted the Great Slaty Woodpecker at 7 locations out of the 50 surveyed (Table 1; Fig. 1). The mean group size was 3 and ranged from 1 to 5 individuals.

At four of the locations with Great Slaty Woodpecker sightings, we also encountered trees with nest cavities of the species (Table 1; Fig. 1). Cavity trees were found at four other locations; however, woodpeckers were not sighted at these locations. At some places, we found a cavity tree with other cavity trees in its proximity, suggesting site fidelity for nesting.

Almost all cavity trees had multiple cavities arranged in a vertical formation (Fig. 3). The number of cavities ranged

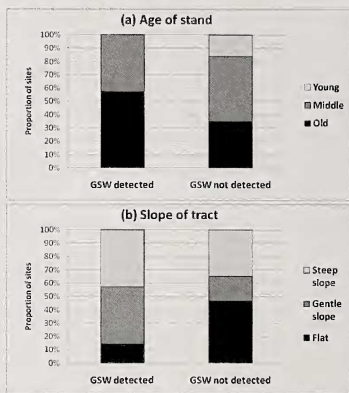


Fig. 2: Habitat characteristics viz. (a) age of stand, and (b) slope of the tract, at sites where Great Slaty Woodpecker was and was not detected. Y-axis indicates proportion of sites

from one to nine in a tree (Table 2). The median DBH (diameter at breast height) of cavity trees was 53.5 cm, suggesting that only mature trees were suitable for excavating cavities. While almost all the cavities were in live trees, it was observed that many of these trees were deformed or otherwise infested (Table 2).

Most of the Great Slaty Woodpecker detections were in old Sal stands and the rest in middle-aged Sal stands. Locations with young Sal did not yield GSW detections, suggesting that young stands are unsuitable (Fig. 2a).

Areas that had Great Slaty Woodpecker detections were mostly on steeply or gently sloping ground (Fig. 2b). The species was seen only in Sal stands and was not seen in mixed forest.

We made detailed observations on two cavity sites used by the Great Slaty Woodpecker. At the first site, which was located in Kotdi Range, Lansdowne Forest Division, we observed that the woodpeckers (seven in all) emerged from their roost/nest cavities a few minutes before dawn and perched on an emergent bare branch of another tree near the cavity tree. This was accompanied by a lot of vocal communication and contact calling. Thereafter, the group dispersed to their foraging grounds in the surrounding Sal forest. At dusk, the group congregated in one or two trees near the cavity tree. This was accompanied by a lot of vocalisation. Then, one by one, the woodpeckers entered their respective cavities, taking



Fig. 3: Photograph showing multiple cavities of Great Slaty Woodpecker in a single tree

up to five minutes to first inspect the cavity before entering it. It was noted that at this time the woodpeckers were extremely cautious and immediately flew away at the slightest disturbance.

At the other cavity tree location in Kansrao Range, Rajaji National Park, we observed a group of three GSWs.

Table 2: Details of Great Slaty Woodpecker cavity trees

Location	Tree species	Tree condition	DBH (cm)	No. of cavities
Chaukham	Sal	Live, broken top	57	3
Chaukham	Sal	Live, broken top	50	4
Hazara	Sal	Live	47	2
Sain Sot	Sal	Live, bent	35	6
Sain Sot	Sal	Live, termite infested	46	8
Sain Sot	Sal	Live	47	8
Kansrao	Sal	Live	67	1
Thano	Sain	Live, slanting	63	9
Barkot	Sain	Live, broken top	61	1
Barkot	Sain	Live	79	1
Mean ($\pm$ SD)			55.3 ($\pm$ 12.7)	4.3 ($\pm$ 3.2)

A breeding pair was engaged in what was most likely to be incubation, both male and female participating in turns. An incubation session lasted 8–48 minutes, at the end of which the bird that was outside came to the mouth of the cavity and signalled to its incubating mate, who emerged from the cavity. Immediately after emergence, the other replacing individual entered the cavity to assume duty. We observed one more individual, likely to be a helper, in the proximity of the cavity, but it apparently did not participate in incubation duties.

DISCUSSION

Our study has revealed that the Great Slaty Woodpecker is extremely rare in the survey area. However, in most places where the species was detected, we had multiple sightings, which suggests that it can be locally abundant. Further, in some cases, the species was sighted in locations from where it has been reported earlier by naturalists, suggesting a fair degree of nest site fidelity.

The present study found credible evidence of breeding of the Great Slaty Woodpecker nearly 100 km westward of the recorded limit, i.e., Kolhu Chaur. Observations at Kansrao in Rajaji National Park confirm that the species is breeding in the Doon Valley.

Although we did not get adequate data to make conclusive statements on habitat preference, the present study does offer insights into some important factors that may influence the Great Slaty Woodpecker, particularly its breeding. Large trees, snags, and contiguous Sal forest seem to be vital for this species.

Our observations on the cavities of the Great Slaty Woodpecker are a significant addition to the current knowledge about this species. The fact that frequently deformed and infested trees with a median DBH of 53.5 cm are suitable sites for cavity excavation underscores the importance of large, 'imperfect' trees as a breeding requirement of this species. Selective logging, silvicultural operations such as thinning, removal of deadwood and pruning, and conversion of Sal forest to plantations of exotic species, could further endanger this rare species. Finally, our observations on breeding-related activities of the species shed light on the behavioural aspects of this little-known and vulnerable species.

We recommend that the remaining old-growth stands of Sal forest be conserved without silvicultural procedures in order to conserve this species. It is also necessary to consolidate the existing old-growth forest present along the Himalayan foothills by restoring contiguity at the landscape level, possibly through reworking of management plans and initiating restoration activities in the lower Himalaya. This is already happening,

since timber extraction has come to a halt and large parts of the area are being prioritised for wildlife conservation. Our study indicates that the GSW could possibly be a flagship species for overall bird diversity in the Terai Arc Landscape. Such linkages could be explored in future research.

ACKNOWLEDGEMENTS

We thank WWF-India for its generous financial support to the project under the Small Grants Programme.

We thank Imam Hussain, Amir Hussain, Neeraj Sharma, Soumya Prasad, Suniti Bhushan Datta, Khazanant, Mohan Joshi, Monica Kaushik, Abhishek Juneja and Avlok Juneja for their help in the field. We are also grateful to Dhananjai Mohan, Pratap Singh, Abishek Harihar, and Kiran Arora for their support to this project. From the Uttarakhand Forest Department we thank Shrikant Chandola, Paramjit Singh, S.S. Rasaily, Narendra Singh, Rakesh Kumar Shah, J.S. Suhag, Meenakshi Joshi and the entire field staff for their cooperation during various stages of fieldwork.

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